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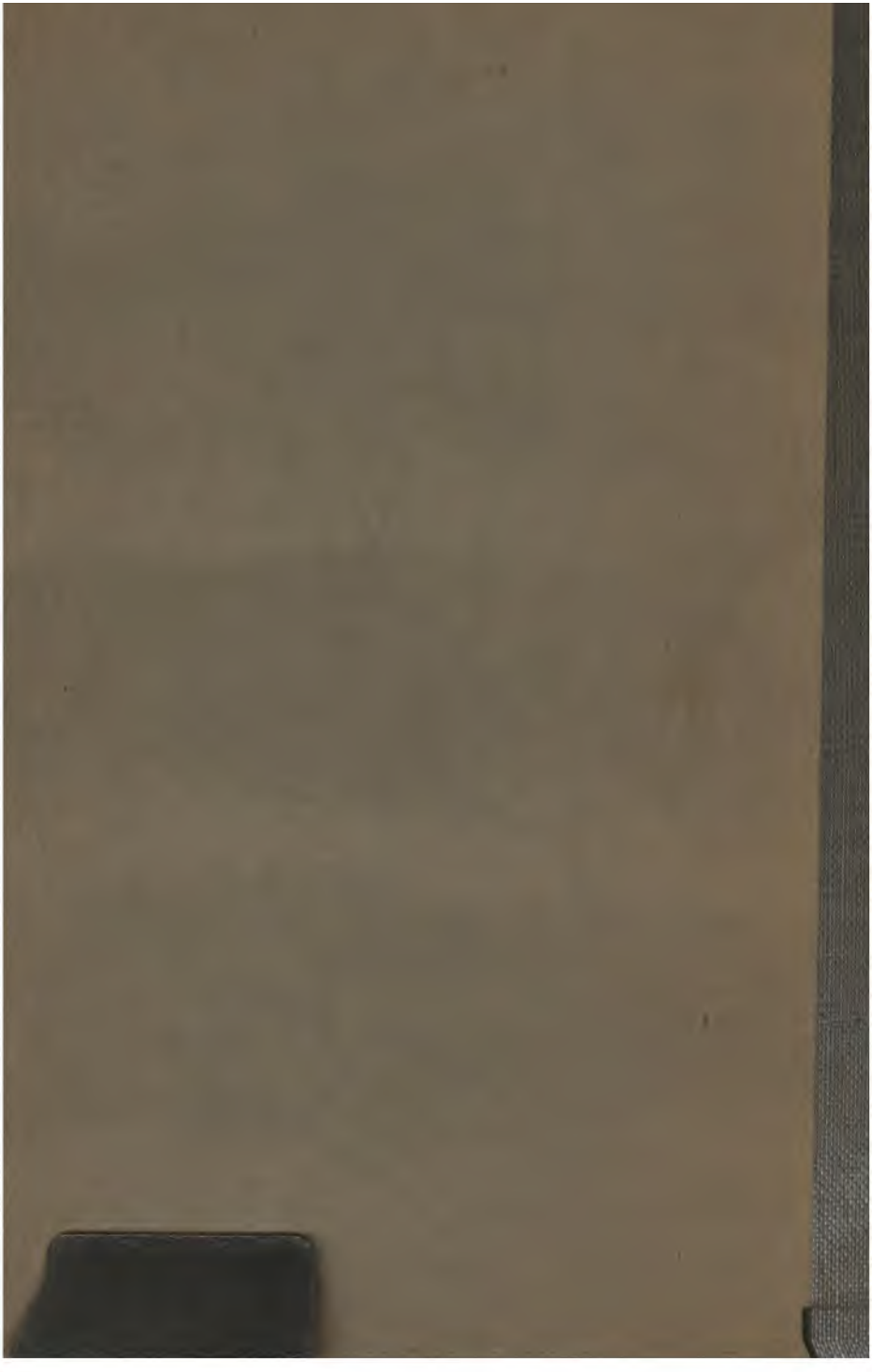

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SESSION 1836.

STEPHENSON'S LONDON AND BRIGHTON RAILWAY.

SPEECH

OF THE

HON. J. C. TALBOT,

ON SUMMING UP THE

ENGINEERING EVIDENCE

GIVEN IN SUPPORT OF

STEPHENSON'S LINE,

BEFORE THE

HON. COMMITTEE OF THE HOUSE OF COMMONS.

17th MAY, 1836.

WESTMINSTER:
VACHER & SON, LAW-STATIONERS,
29, PARLIAMENT-STREET.

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HOUSE OF COMMONS.

COMMITTEE

ON

LONDON AND BRIGHTON RAILWAY BILLS.

Tuesday, 17*th May*, 1836.

LORD GEORGE LENNOX *in the Chair.*

Mr. Talbot.] It now becomes that which, I am afraid, I must term as well my painful as my unexpected duty, to present to your Lordship and the Committee some observations upon this case, I say unexpected, because at a previous stage of the case I had prepared to address the Committee on the subject. The case was interrupted by the determination of the Committee, most beneficially as I think for all parties, and the case of the several opponents was brought forward as to the engineering merits of the different lines, and I flattered myself that I should have escaped the luxury, if it be one, of a speech upon the present occasion. However, the only effect has been to protract the period of gestation a little longer, and I hope that the delivery will not now be impeded; I am however sensible that I am very imperfectly prepared to do justice to the case, and I may readily make that avowal when it is remembered that Your Lordship and the Committee have been sitting through I believe thirty-five days at least, in the discussion of this matter. That consideration, however, persuades me also that it will be unnecessary for me to advert to much of the evidence that has been laid before the Committee, for it would be paying a very ill compliment to the Committee to suppose that they have not, each and every one of them, arrived at as good a knowledge of the case as we can hope at this hour to communicate to them by our speeches. Your Lordship will remember that we are confined

upon this occasion to the engineering merits of the respective lines, and I am sincerely glad that so far my labours are lightened that I need not detain the Committee by any observations with regard to the evidence which was given in the early part of the case as to the great and important traffic which may be expected upon a railway between London and Brighton. It is to the interest of all parties to assume that the traffic will be very great, and it is admitted by all parties that it will be so.

Now, my Lord, with respect to the line of Mr. Stephenson, I think I cannot approach it better than by considering the general direction, or as the engineers term it, the location of the line. It may be described generally as a line avoiding the ridges which divide the country between London and Brighton at three or four several points, following as far as may be the vallies of the Mole and the Adur, and, instead of traversing, going round those ridges. It may with reference to the line of Sir John Rennie be called, as it has frequently been called in this discussion, the western line, and if I wanted any thing to confirm me in the very strong opinion I have entertained ever since I had anything to do with this case, that Mr. Stephenson had taken a most correct view of the general direction in which it would be expedient to lay down his line, I think on this part of the case I am assisted, and assisted most materially, not by Sir John Rennie, but by the other opponents to this Bill, for if you will do me the favor to look at this map appended to the little publication of Mr. Gibbs you will find, I think, not less than six projected lines upon this map, including that of Mr. Gibbs, with whom as with Sir John Rennie the approach to Croydon is a *sine qua non*, every one of them, with the exception of Sir John Rennie's and Mr. Palmer's, taking the same western direction, and as far as the general direction of the line is concerned, I have a right to say that, upon the opinion of Mr. Gibbs, upon the opinion of Mr. Cundy, upon the opinion of Mr. Vignoles originally, Mr. Vignoles acting at that time under the direction of Sir John Rennie, and therefore I may say upon the opinion of Sir John Rennie himself, I have a most undoubted tribute to the accuracy of Mr. Stephenson's judgment. But it does not rest there, for within these few days we have had still another addition to the body of overwhelming testimony we possess on this part of the case in the person of the distinguished individual who filled that chair with so much credit to himself and so much advan-

to the Committee, indeed I might also say to the country—"the
engineer," Mr. Mills. Mr. Mills proposes another line in
and I have therefore the benefit, *quantum valeat*, and I
is of inestimable value, I have the inestimable tribute
the Government engineer (and I congratulate them

TF 64 .L83 T13
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the possession of so distinguished an officer) in favor of the western direction of Mr. Stephenson's line. I have the evidence of these gentlemen, with the exception of Mr. Palmer, to the general assertion that the western line to Brighton is the best. And with regard to Mr. Palmer's opinion, it should be remembered, his was a line originally laid down with a view to communicate with Dover, in short, to form a South Eastern Railway, Brighton was an auxiliary and not the main object, in that railroad. The testimony of Mr. Palmer, therefore, is as nothing upon the merits of an eastern line to Brighton, and Sir John Rennie is left alone with respect to the adoption of a line to Brighton in that direction. And, my Lord, I think, when it is considered that the eastern line must, of necessity, first, traverse the Merstham Ridge, then the Balcombe, then the Cuckfield, then the Clayton Ridge, we need not go further for reasons for adopting the western line, which avoids all those difficulties; but if we must go further, I claim, for Mr. Stephenson, the most beneficial approach to a most important list of towns upon this line. And first with respect to Croydon, my friends who appear for Sir John Rennie are extremely anxious, and I shall have a word to say to that by and by, to hook us into a sort of continuation of the line from Croydon to London. We know nothing of that project but this, that for the sake of accommodating those whom Mr. Gibbs represented, who felt a deep interest in the welfare of that part of Surrey, who thought the communication between Croydon and Brighton of great importance to Croydon, we have agreed (and the arrangement is within the cognizance, if not in the very hands, of the Chairman, and, therefore, open to the inspection of the whole Committee) we have agreed, simply for that reason, to give such a communication if it should be required, and if any body is found ready to make it between Croydon and our line. Therefore, so far as the passage to Brighton is concerned we shall accommodate the town of Croydon, which is, undoubtedly, a most important place. Then, with respect to the other towns, we pass in the immediate neighbourhood of Ewell, Epsom, Leatherhead, Dorking, Horsham, Grinstead, Steyning, and, above all, of Shoreham to Brighton. I remember very early in this case, an honorable and gallant Member, whom I do not now see in the room, but who represents the town of Brighton, was pleased to say that the approach to Shoreham was a *sine qua non* to a Brighton Railway, and I entirely concur with him; and if that is to be the issue upon which this case is to be decided, then I ask the Committee to decide it upon Sir John Rennie's principles; and I say that upon those principles, I must have the verdict upon that issue, for, unquestionably, so far as *Shoreham is concerned* we offer the most direct and the shortest line.

Upon that point I shall have to speak of Sir John Rennie's branch to Shoreham by-and-bye; but upon the point of the direct approach to Shoreham, undoubtedly our line approaches it more directly and with better levels than that of Sir John Rennie, and I need not dilate further, I feel persuaded, upon this head, as connected with the communication to Brighton.

Now, we have heard something about Newhaven, I doubt very much whether that feeling which we have heard of, as existing at Brighton, would go along with my friends very far, if they made out that the effect of giving Sir John Rennie's line to the Brighton people would be to make Newhaven the harbour of Brighton, because between Newhaven and Brighton, the road, first of all, as compared with Shoreham, is very long: it is, in the next place, exceedingly hilly, and the communication between those places very difficult. I apprehend, therefore, that the consequence of making Newhaven the port for transit from Brighton to the Foreign Coast, would be to strip Brighton of a portion of a very beneficial traffic: whereas, if you take it to Shoreham, which is the natural port of Brighton, where the packets run when they cannot get into Brighton, and the place where the packets lie when they are not actually on their voyage; if you take it there, you take it to a place, the proximity of which to Brighton affords to Brighton all that advantage; the line also carrying the imports of Shoreham throughout the intervening district to London, most beneficially and cheaper than by a branch line, because it is a part of the main line, for that should never be forgotten. If Sir John Rennie's Shoreham branch is to be the line as between Shoreham and the main line, the whole expense of that branch must be paid by Shoreham traffic only, whereas the expense of Shoreham traffic to Brighton will be shared if Mr. Stephenson's line be adopted, by every individual ton of goods carried upon the whole line. The carriage, therefore, by our line, so far as Shoreham is concerned, must be more beneficial and economical than it can be by Sir John Rennie's line.

With regard to Shoreham I should remind the Committee of what was proved very early in the case, so long ago, indeed, that it has probably escaped the recollection of the Committee, that we have it in evidence (and I am entitled to mention it, as bearing upon the question in an engineering point of view,) that there has been a resolution passed by the General Steam Navigation Company to the effect that so soon as this London, Shoreham, and Brighton line is passed, that moment will they establish better packets at Shoreham, and greater facilities will be given to proceed to the foreign coast, I need not enlarge upon the subject of the convenience which will result from that.

TF 64 .L83 T13

I have now done with the question as to the general direction of Mr. Stephenson's line. This is not as is too frequently the case in the present day, a matter which has been taken up hastily, or has been considered lightly by Mr. Stephenson. Mr. Stephenson was called on to report between Mr. Cundy's line which runs in nearly the same direction as that of Mr. Stephenson, and Sir John Rennie's line, and if Mr. Stephenson was the *pirate* he is supposed to be, there is no reason why he should not have pirated Sir John Rennie's as well as Mr. Cundy's. I say that investigation was necessarily impartial; it was gone into with the greatest care by Mr. Stephenson, and it was on that occasion that having no time to undertake the detailed survey himself, he recommended the line of country through which the line of survey should be taken; that survey was taken by Mr. Bidder, and you will be told, as you have been told by my opponents more than once, that the line is Mr. Bidder's and not Mr. Stephenson's. Now a question was put to Mr. Stephenson on this point, and he most distinctly repudiated the imputation that this was Mr. Bidder's line, or that he had lent his powerful name for the use of Mr. Bidder. He says:—"Mr. Bidder acted "under me in this case as he would if I adopted any other line. No "engineer in my situation has time for the necessary taking of levels "or detailed survey. I speak to the general direction. I came to that "conclusion at which I have arrived after mature deliberation, the pre-"cise location of the line"—(and that seems to be a sentiment worth echoing, at I do not know what per line in the *Times* every morning)—"the precise location of the line was Mr. Bidder's." That was Mr. Stephenson's expression, I am willing to abide by the consequences of it; all I care about is, that Mr. Stephenson has investigated the subject of the position of the line, and has, on deliberation, fixed on that upon which he has the concurrent testimony of every engineer who has approached the subject, except Sir John Rennie.

Now, my Lord, I think the best plan I can pursue is to take the section, and to follow first of all Mr. Stephenson's line, and next Sir John Rennie's, and then submit a few remarks upon the comparison of the two, I shall of course start from London with Mr. Stephenson. Strictly this is not a part of his line, but we do not want to rest on any technical ground, and therefore I will proceed to discuss the merits of the London and Southampton terminus, that being at Nine Elms, a quarter of a mile from Vauxhall-bridge, approaching that spot, through comparatively an uninhabited district. I mean by that that the line interferes with no streets or houses. It was given in evidence upon the Great Western line, that the Southampton line approached the river Vauxhall, and

actually destroyed only a stone-mason's shed. We are told that this terminus is exceedingly distant and inconvenient; my friend, Mr. Harrison, relies too much on an assumption. I think my friend, Mr. Harrison, seemed to think that the only thing any man at Brighton had to do, was to come up from Brighton to the Royal Exchange, to open his letters, and to go back again. Now I rather differ from that. I say, and I have a right to say, that the selection of the Royal Exchange as a *sine quâ non*, for a proximity to a terminus is an arbitrary assumption, and I put it to the experience of honorable Members, which way does the posting go. I put it to the experience of honorable Members, whether four pair of post-horses, to one, do not go from the west end of the town.

A Member of the Committee.] It was understood that this was a summing up of the engineering case, and the Counsel is now going to points of traffic, from the discussion of which Sir John Rennie's Counsel have been precluded for the present by the decision of the Committee.

Mr. Joy.] I should have interposed if I had thought my friend was travelling beyond the resolution; we have direct evidence which we should be ready to tender against his line, if ever the Committee should feel disposed to hear it; but I think the terminus so essential a part of the engineering question, and I am so happy to meet my friend upon it, that I should be sorry for it to be shut out.

Mr. Talbot.] I am not surprised that the honorable Member for Lewes has already been too much tired and wearied with what I have said, to have attended to the way in which I am shaping my observations. It does not require much argument to shew that a more important point, in an engineering point of view, cannot arise than the selection of the terminus. It is a point which was much relied on by my friend, Mr. Harrison. What I am urging is, that my friend has no right to say that London-bridge is the point to which every body must come, for I have a right to say that Charing-cross is as fast a point, and then I am ready to meet him and say my terminus is as good as his; but if not, then there is a most important recommendation of this terminus at Vauxhall-bridge, the opportunity it affords for a communication with Waterloo-bridge. Sir John Rennie has thought fit to say that such a thing is impossible; that is rather inconsistent with another estimate of that gentleman's, that it would cost £300,000 to get to London-bridge. It is in evidence that the ground falls from the approach to the terminus at Nine Elms, and though you may not be able immediately, nor is it desirable from the depôt to branch off to the eastward; yet, by leaving the line at a little

ance from the depôt itself, you may approach at easy levels to

Waterloo-bridge, and I do think that prejudice apart, no two individuals can differ from this proposition, that for the greater majority of the inhabitants of London, a more convenient situation than the foot of Waterloo-bridge it would be difficult to find. I know it has been a desideratum for many lines, especially lines coming from the south, and I know that it was the first impression of Mr. Brunel, the advocate and engineer of the Great Western Railway, that if he could by possibility get to Waterloo-bridge, that would be the best situation to be found, even for a western approach, but he was deterred by the expense and difficulty of crossing the river. I will, in obedience to the scruples expressed by an honorable Member of the Committee, not detain you further upon this subject of the terminus at London. I submit that there is no ground for the assumption that it will be productive of any inconvenience, but that on the contrary it will be found a very desirable terminus, especially as it is in evidence that a plan already exists for the extension of the line to Waterloo-bridge.

Proceeding then along the line of the Southampton to Brighton, I am brought to the junction with the Southampton Railway of our line; and here I am bound to remark, upon an inconvenience which, it is said, we are to cause at the junction. It is assumed that because the junction will take place in cutting, that it will therefore be impossible for the two trains to see each other, and that collisions must be apprehended :—now, in fact, there is no such difficulty, if the two lines join in this way ; if the train supposed to conflict with the other, is coming in the direction from London, the curve is so slight, and the line approaches so near to a straight line, that the train will be seen. If the train is coming on this line from Brighton, and supposed to conflict with another coming from Southampton, immediately before the cutting which is very short, there are embankments from which each train will have the opportunity of seeing its competitor, and regulating its speed so as to avoid concussion. If it had been in a long cutting, there might have been something in it, but it is not so; and here all collision may be avoided. The objection, therefore, is groundless, and altogether fails.

Now, upon the subject of the works upon this line. I really feel that I have no justification whatever for detaining the Committee one moment, except it be to observe that the works upon it are for such a line, and compared with other lines which have been executed comparatively slight. It is, however, with respect to these embankments, a very material feature, as compared with Sir John Rennie's line, and connected with the subject of spoil banks; which constitute one of the greatest nuisances on railroads, that, with little exception, these works compensate one another.

I will postpone the gradients for the present, observing only that whereas Sir John Rennie has four summits of considerable magnitude between London and Brighton, we have this single one at Capel, and a more simple and economical mode of working a railroad cannot, I believe, be elsewhere found, than will here be adopted.

I come then to the consideration of another point, upon which much has been said, that is upon the Brighton terminus, or rather termini, of Mr. Stephenson's line.—I need not remind your Lordship at this late period of the investigation, that we have there two termini, and I contend with confidence, that, with respect to either one of those termini, both and each of them are superior to the terminus of Sir John Rennie. That I undertake to establish. With respect to the western terminus, it approaches to the back of Brunswick-square. It has been said that it is to be a great nuisance to Brunswick-square; now it should not be forgotten that it is in that part in cutting, that the whole of the depôt, or nearly the whole, will be out of sight, being occupied by sheds, so that there can be no nuisance of that description, that the approaches of the engines will not be perceptible from those houses. That between the houses in Brunswick-square and the depôt, there are what may be called third-rate houses, and the thing is at some distance from the houses, and that it has this recommendation, that if it makes a noise at the back of Brunswick-square, it takes away a noise from the front of it. In short, I will venture to say, that if any impartial person will take the opportunity of seeing that spot, and considering the model which has been produced, and the mode in which the depôt is to be executed, he cannot say that damage or injury can accrue to Brunswick-square, from the situation of that terminus. We all know that many unfounded apprehensions arise upon the subject of railways. It is in the knowledge of many during the first discussion of the Liverpool and Manchester railway, there was a gentleman bitterly opposed to that line, whose chief ground of objection was, that the line was to pass in front of his house, and that he was to be annoyed by the noise and passage of the engines. He insisted on a wall being built to protect him from this; and he actually came in a few months afterwards, and intreated the company that the wall might be taken down, and taken down it was, and he now enjoys a full view of the engines, much to his satisfaction. I do not know whether there are any old ladies living in Brunswick-square. I should think there are; but I will venture to say, that a more unfounded apprehension was never entertained. From Brunswick-square, first of all the traffic upon the railroad is not visible, but the traffic in coal carts which pass

ing at the rate of 45,000 chaldrons a-year, is very visible

TF 64 .L8
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indeed, and a very serious nuisance. I contend, and I am not afraid of what my friends shall say upon that subject, that no nuisance whatever will arise from the situation of this terminus. Another allegation has been made about this, which seems to me a little inconsistent with the other, that this is a job of Mr. Goldsmid's to get the depôt here for the benefit of his property. Now, if this railway is to be such a destructive thing to the houses in his neighbourhood, Mr. Goldsmid must have shut both eyes before he asked the railroad to come there, for it approaches much nearer to valuable houses of his in Adelaide-crescent, than to any house in Brunswick-square, and whatever injury it does to Brunswick-square it must do in a tenfold degree to the houses in Adelaide-crescent. It is also due to Mr. Goldsmid that I should remind the Committee that Mr. Stephenson has stated, (and whatever other imputation may be made against Mr. Stephenson, his veracity will not be impeached,) that it was without reference to Mr. Goldsmid at all, without reference to the knowledge that it was Mr. Goldsmid's property, which he did not at that time possess, that he made that selection; and it is further due to Mr. Goldsmid to say, that for a long time, until he was persuaded of the error under which he laboured, he was a strenuous supporter of Sir John Rennie's line, which did not affect his property either beneficially or the reverse, except as an inhabitant and proprietor at Brighton. I think, therefore, there is no ground whatever for the imputation on Mr. Goldsmid, or upon the promoters of this line, for Mr. Goldsmid is not omnipotent in this matter, and it is not to be supposed, that unless the terminus were really good, even if Mr. Stevenson would have selected it, the other proprietors would have acquiesced in it, simply to please Mr. Goldsmid.

My Lord, I have said that I conceive, that with respect to both these termini, I can shew them to be better than the one of Sir John Rennie. It is supposed this western terminus is to be very prejudicial to the inhabitants of the East of Brighton, Kemp-town in particular. Now it is in evidence, and admits of easy demonstration, that any party proceeding from that part of the town to Sir John Rennie's terminus, must, probably, pass by the Steyne. It is as commodious, to the full, as any other approach. There are no diagonal streets, the fall of the ground would be an impediment, if there were. If you make a right angle in your passage from Kemp-town to St. Peter's Church, you actually come as near to Mr. Stephenson's western terminus as you do to Sir John Rennie's, with this most important difference, that if you continue on Mr. Stephenson's line you have the advantage of going on a level, whereas if you go by Sir John Rennie's you must mount a height which, when you *get to it, would place you* where you would be if you had ascended

chimney of one of the houses on the East cliff. Now can there be a comparison made on this part of the case, which will entitle my friends to lavish on this Western terminus so much vituperation as they have done, and can there be any reason for such a comparison, when, admitting the distances to be nearly equal, there is the difference between a level and an elevation of that description? Then, with respect to the Shoreham traffic, it would bring that to a very convenient place for distribution to the whole of Brighton? I believe if you draw a circle of equal diameter from Sir John Rennie's and Mr. Stephenson's termini, you will find the majority of the population in favor of Mr. Stephenson; and it is not to be presumed, I think, with any shew of reason, that it will be desirable for the coal carts from Shoreham to approach to the height at which Sir John Rennie's is, almost out of Brighton, for the purpose of coming down again. Now, with respect to the Northern terminus, which we approach from Shoreham, with the disadvantage, it is true, of a tunnel, to be set against the disadvantage of an inclined plane of a mile and a half at an inclination of one in a hundred on Sir John Rennie's branch. We come nearer to the town by some hundreds of feet than Sir John Rennie, and come here again upon the level, and therefore we are not open to the objection to which Sir John Rennie's line is so justly exposed on the ground of its extreme elevation. I contend, therefore, that there can be no difficulty or hesitation, in the minds of the Committee, as to the selection of the best line, in point of termini, and that that line is Mr. Stephenson's. If I wanted confirmation as to this, I would refer to the early evidence given by Mr. Clark, and I would remind you that the Committee, who duly considered this matter at Brighton, for the interests of Brighton, resolved that the termini of Mr. Stephenson, at Brighton, were those which it would be conducive to the interests of Brighton to adopt; while in London they preferred that of Mr. Gibbs, so upon that decision I am, at all events, upon an equality with my friends, so far as London is concerned, and superior to them as to the Brighton terminus, if that well-matured opinion is to go for any thing. I believe, my Lord, that I have now done with my remark on Mr. Stephenson's line, except so far as it may be necessary to recur to it when I come to a comparison of the two.

I now approach Sir John Rennie's line from London, that line originally, and up to a late period, was destined and intended to end at Kennington, as the best possible terminus, in Sir John Rennie's then estimation, but now at last has found rest for the sole of its foot at London-bridge, joining with the London and Croydon Railway, in the first *e, and afterwards* with the London and Greenwich. Now with

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respect to the London and Greenwich Railway, even before we get on it there is a most material thing wanted; and one of the great essentials of a railroad, there actually is a terminus wanting. There is no depôt at present, there is an Act to purchase one, but that must be paid for, and at present the Greenwich people have not a terminus sufficient for themselves, and the London and Croydon Railway propose to add to it; but does it at all follow that that is to be sufficient for the Brighton Railway, as well, I apprehend not; and if not, what a sack have you run your head into! You have brought your Brighton Railway into a place where land is gold, and where you cannot buy it even if you had the money; you are to go for a mile and a half, or nearly two miles (Mr. Gibbs told us nearly two miles, though Sir John Rennie said less), upon the London and Greenwich Railway, upon the most expensive part of it, where the cost of that railway was £150,000 per mile, and then you are to branch off to Croydon. Now, with respect to that junction, I shall have occasion to advert to it presently; but I cannot quit this part of the case without reminding the Committee that Mr. Price left us in a degree of uncertainty as to how they were to get down to it, for according to him there was a difference of twenty feet in the level. He came to explain the alteration of the inclined plane at the Croydon, and he actually found himself in the difficulty, during his cross-examination by my friend Mr. Wood, of being unable to say how, after crossing that valuable district to the Greenwich Railway at Bermondsey, or thereabouts, at a considerable elevation, he is to get down to the same level with the Greenwich. Now that is one of those points on which one would have expected some individual to be called who would show how that was to be done—that, at least, would be expected of persons who hope to carry a Bill in Parliament. With respect to the Croydon Railway Company, they have had their Act of Parliament now for more than a-year, I believe, but from the time they obtained the Royal Assent, to the present moment, not a particle of the work has been done. That would either bespeak no great anxiety for a line from London to Croydon—that London-bridge is not such a monstrous boon as my friends would represent it to be, or else that it is a very bad line, and I am inclined to think that the latter is the true solution of the problem. At all events, this I am entitled to say, if the Committee will bear in mind the plan put in, showing the proposed alterations, that there is not one half mile of that line that is not to be altered most materially. With respect to the alteration of the plan of one in 110 that is to be avoided by the deviation, which will have the effect of throwing the line into very much deeper cutting, in about the worst soil in this truly detestable neighbourhood, so far as engineering

operations are concerned, the London clay. The London clay, which is the very worst clay, or thereabouts, that can be found, is to be found in that deviation, in the course of which they plunge into immense cutting. Mr. Price would not quite admit that, but when he came to be pressed, and asked, " If you have got a bad curve and a plane, and by a little " deviation you might have improved that plane and that curve, and not " have increased your cutting, what do you say to the skill of Mr. Gibbs " or Sir John Rennie, as engineers?" He was obliged to admit that there were considerable difficulties which deterred Mr. Gibbs from taking originally, the line now proposed.

Committee.] What place do you allude to, when you speak of the London clay?

Mr. Talbot.] Forest Hill, Sir. Now we have to approach Croydon, and I really am afraid to embark in the sea of attempting to remind the Committee of the shiftings and changings, and uncertain aberrations which my friends have gone through informing you how Croydon is to be approached. Sir John Rennie, in particular, was entirely ignorant as to which way they meant to go through Croydon, for we began with two curves of eight chains and fifteen, curves which Mr. Rastrick, an engineer, called to support. Sir John Rennie says, you may with difficulty struggle through, but the friction would be tremendous. I repeat his very words, " and I would not in my judgment, as an engineer, recommend any such " curve to be laid down." Would you have any reliance on an engineer who did? "I cannot say as to that," said Mr. Rastrick; but he appeared to think that his shoulders were not broad enough to bear the imputation of laying it down. It is altered now, at the eleventh hour, probably, in consequence of some of those conundrums and mystifications of Dr. Lardner. It was altered to a radius of at least twenty-five chains. I shall have a word or two to say bye-and-bye as to the expense they will run into by that, for Croydon is not a place in which you can alter your line from right to left, without interfering with valuable property. This, too, I am at liberty to say, that here, as with respect to the Greenwich, they have not yet shewn us that their levels will coincide with those of the Croydon Railway, and I really must think that on a point of such vital importance as to whether they could get on with this line, it would have been satisfactory, at least, to have had some gentlemen called, possessed of competent knowledge on the subject, who could have told you the elevation of the Croydon Railway is such, and the elevation at which Sir John Rennie will approach it is so and so, they coincide, and there will be no difficulty in it. With respect to the curves, too, some coincidence should be shown, for I understand it is far from shown that those curves would become tangents to

TF 64 .
Stephens

the Croydon Line. On the contrary, I believe that an angle will be made. But we are not left quite in uncertainty on these points. The south-eastern approaches to join the Croydon Railway at or near this very spot; and this much is certain, and any gentleman who will take the trouble to walk to the Private Bill Office, and examine the sections of that line, and compare them with Sir John Rennie's Line, will be satisfied of the fact that the South-eastern and Sir John Rennie's Line approach the Croydon Line at different levels. I do not know which may be right, or which wrong; but this I know, it would have been satisfactory to have had it proved that Sir John Rennie was right, and that he was to approach at a level which would enable him to join with the Croydon. With respect to the curves, also, I will make this observation, that they have been altered. It has been found absolutely necessary to alter them, in order to coincide with the other line, and when you come to be within twelve yards of the church-yard at Croydon, it would certainly have been desirable, for the sake of the church, and the interests of those who are reposing in the church-yard, (if nobody else,) that we should know accurately where the line goes, and whether it will not be necessary, if the curves are carried in that direction, that the church-yard should be intersected.

Mr. Talbot. Then the moment Sir John Rennie gets out of Croydon, he gets into a most tremendous difficulty. He gets into Mr. Carbonell's park, which is a very pretty place, as many Honourable Members very well know. He gets into it, but where, he could not exactly tell you, that was to be a matter of ulterior arrangement. My friend, Serjeant Merewether, reminded him of the increased expense which that would occasion, he said, "if that is so, we can go on an embankment." But that will be very disagreeable, for it will block up the windows, will it not? "Oh!" they said, "we can go lower down." But he was reminded that there were some good houses which would cost money. "Then "there would be no difficulty in going behind those houses." But even there this persecuted man was not safe, for he found himself in the arms of the South-eastern Railway, which already occupies the ground, and he was at last obliged to put the Merstham tram-road between him and Mr. Carbonell, leaving that gentleman with the satisfaction of anticipating Sir John Rennie's Line going right through his park, with the Merstham tram-road as an interlude between Sir John Rennie and himself. Sir John Rennie's mode of getting out of it is not very soothing to the landowners, for he says, "in fact it is a matter of £10,000—we can buy Mr. Carbonell off. It really would be wasting your time to comment

any longer upon this part of the case. I will only say that if I were Mr. Carbonell, I would not take £10,000, or anything like it for that park.

Now we proceed along Smitham Bottom, and there Sir John Rennie's line crosses the road. Now the road at that part appears to me to have been made with great skill, and probably at considerable expense, with a view to a gradual ascent over the summit. Sir John Rennie proposes to have the road under him, and to remove the benefit of that gradual ascent. He was asked whether that was not in a valley, and whether there was not apprehension of a deposit of water there; and the answer he gave was that there was a fall to Croydon, and that six inches in a mile would be sufficient. Now, having heard something of draining, and having heard ten or twenty feet per mile talked of as being necessary, it was new to me to hear Sir John Rennie say that six inches in a mile would be sufficient. However, Sir John Rennie says so, and I suppose we must take what so eminent a man says upon such a subject as conclusive. But this he did not deny, that the elevation and draft upon the road must be increased, thus undoing what the trustees have laboured to effect for so many years past. Then the ascent at Smitham Bottom brings us to the cutting previous to the Merstham Tunnel, and this enormous work gives rise to one of the strongest objections to Sir John Rennie's line. We have there a cutting which I think we estimate at somewhere about two million yards, because poor ignorant and benighted people as we are, we were under the erroneous supposition that one to one was a proper slope. We have adopted that upon our own line, and have known it to be the same on every other line. We thought we might rely on Mr. Stephenson, but Sir John Rennie tells us that it is to be only 1,400,000, his slope being that of two inches to the foot, or one-sixth to one. The cutting is at many parts as much as eighty feet deep for a considerable distance, and of these 1,400,000 cubic yards, actually 1,200,000 cubic yards are to go to spoil. If that were properly considered it seems to me to form a sufficient objection to any line of railroad whatever, for in a narrow ravine where the stuff must be taken out at the end, and disposed of in lateral valleys, (which Sir John Rennie alone can discover), or lifted up the sides of a hill, or, as Mr. Robinson said, even over the hill, can any greater nuisance be conceived on earth? Or is it possible for any rational man to believe, that that is a work which can be executed at a less price than work of the same description can in ordinary cases be executed at? Extraordinary as it is are you to put it below the ordinary price? That is a question which Sir John Rennie answers in the affirmative, and in my conscience I believe that no other person could be

TF 64 .L83 T13
Stephenson's Londc

found to pronounce a similar opinion. But Sir John Rennie calls a witness to tell you how this is to be done, who says, "Take it out at the end." That is nonsense—a parcel of stuff. "I will have two stationary engines. (At what cost he does not say.) I will draw it along the bottom till it comes to my engine, and lift it there fifty feet out of the cutting, and carry it over the top of the hill;" and this is to be done at the rate of 9*d* per cubic yard, while Mr. Stephenson says it will cost him 11*d*. to carry it upon a level. It seems to me perfectly preposterous, and it will appear to be more so when I call your attention to the other parts of the line, where the very land which goes to spoil would be most valuable where they have recourse to side cuttings. Then it appears that we get through that tunnel, and it will not be forgotten that there again, as at Patcham, (the name certainly is appropriate,) we have patching and mending till we really hardly knew where we were, and really where the curve would take my friend to at this moment we are ignorant, and I am sure Sir John Rennie cannot tell us but of this, I am perfectly sure that in a narrow ravine of that sort, any deviation to the right or to the left must have the effect of throwing you into very deep and excessive works, as compared with these, which are already beyond any thing of which I have had experience. The tunnel is on an inclination, I forgot exactly of what acclivity. It is, I think, a mile and twenty chains long, being equivalent to the whole of the four tunnels on our line, branch included. Then you get through the tunnel to the Jolliffe Arms. There again they have a cutting of at least seventy feet, with the same difficulty, not quite so great, perhaps, though I see the soil is to go further on to an embankment at a great distance, and precisely the same observation applies to this curve as to the other, that if you are to make the curve the tangent to the tunnel, the curve having been originally in the tunnel, and it now becoming necessary to make the curve out of the tunnel, it will lead them into works of excessive magnitude. Now I should not pass by Merstham Tunnel without adverting to that upon which Sir John Rennie's whole case depends as to his earth work, and that is the slope at which chalk will stand. Now a variety of opinions appear to be entertained by the witnesses upon that subject, and a variety of opinions upon that subject appear to exist in the minds of many honourable Members of the Committee; but this, I apprehend, I may say without fear of contradiction, that so far as a cutting of two miles and a-half, in part eighty feet deep through chalk is concerned, any proceeding which should have for its object to carry a railroad through it at a slope of one-sixth to one is an

experiment which has never yet been tried, and an experiment which may be pregnant with the most fatal and destructive consequences, and which I submit to you, you would not engage in without proof the most conclusive, and such you have had none that it can be done with safety. We have heard of the Thames and Medway Tunnel; with respect to that, you have been told that the chalk does fall there, and that it is affected by frost; that it has been found necessary to brick the arch in part; that it has been found expedient to drop a curtain at the mouth of the tunnel for the exclusion of the frost; that in one part there is danger in passing through, and with respect to the stability, that there is no reason to be at all confident that it will stand. But I say, even if it were so, even if it were a cutting of this immense magnitude, and a *canal* passing through it, that still there is no experience to be derived from that of the effect of a railroad passing through it. Why, the very vibration of one of these trains might lead to consequences of the character I have described. Whether that be so or no, this is undeniable, that whenever frost is to succeed to wet, you will be liable to have fissures and separations and parts falling down on the hapless passengers who may chance to be the victims of the moment. Sir John Rennie says, "It is all very well to talk about wet, but wet will be much more likely "to lodge if you have a slope than where it is perpendicular, and I will "put a drain to catch the wet." Now that is plausible, but it proceeds on an assumption, that the danger is from the wet which falls from heaven. That is not the danger. The danger is in putting that sort of cutting in a valley into which of necessity falls the moisture from the surrounding hills, that percolating and perforating the chalk, makes it liable whenever the outward atmosphere has access to it to occasional frost. Sir John Rennie is confident that he is to have lime-stone chalk there. It does so happen, that lime-stone rock being very much wanted, and wanted, too, on the London side of the Merstham Tunnel, the quarries where it is daily got are all upon the Brighton side of the Merstham Hill. Now, if it existed in that deep cutting, why should people take their carts over that hill to draw them back again with a load of lime-stone? I think Sir John Rennie will find, instead of limestone rock, it will be a very rubbly and bad description of chalk. I repeat that the whole case of Sir John Rennie as to his earthwork, which goes to the economy of his line, rests upon the unproved assertion, that chalk will stand upon the slope of one-sixth to one. Mr. Stephenson has had ex-
-nce as to chalk, he has an interest to reduce his work, if possible,
has not found it safe to ask the public to travel through a cutting
ope of that small importance.

TF 64 .L83 T13
Stephenson's Lon

I return then, apologizing for the retrograde movement I have made, to the bottom of the fall which the line takes from the summit at Merstham, and there we find ourselves on Horley Common. If honorable Members know the spot they will find that that is as favorable a piece of table land, as it were, for the passage of the Railway as could be found in His Majesty's dominions; but there, remarkable to say, and wonderful to relate, Sir John Rennie travels the whole distance, with the exception of a little point, on one continued embankment of very considerable magnitude, that embankment not only being ridiculous of itself, as being on the only level land, but being the very spot at which the branches are to approach him; and, therefore, if it is on an embankment itself it makes it necessary to have embankments for the branches. That is well shown by Sir John Rennie himself, when he laid one of his proposed branches, called the Copthorne Branch, on an embankment of the same description as this. Sir John tells you this is the way he means to go to Horsham. I asked Sir John by what line? and he said, "You will find a lateral valley, and there is no difficulty in getting to Horsham." I said point it out on the Ordnance map; and he was obliged to say that the Ordnance Surveyor had omitted to notice it. I believe any body will know that in that part where his line is situated, there intervenes a great clay ridge of the country, through which there is no valley to be found. I apprehend Sir John Rennie will find a difficulty in making a branch to Horsham in that direction. Having passed that, we come to that which is called the Balcombe Summit. Before, however, we get to the tunnel, there we have two miles in which, according to Sir John Rennie, there are 896,000 cubic yards of work. We made it 1,275,000. That was Mr. Stephenson's estimate; but, according to Sir John Rennie, it is 896,000 cubic yards. We then pass through the tunnel, and then we have there another considerable cutting which brings us to an embankment of 348,000 cubic yards. But here, as soon as we get through the tunnel, we have the river Mole, or rather, there are three streams which pass in three separate valleys, and Sir John Rennie proposes to whirl his magical wand, and to amalgamate these three valleys into one. There is then a small cutting, and then, at the River Ouse, you come to an embankment, in parts of 82 feet deep, giving 750,000 cubic yards, crossing over the summit, and getting up to Cuckfield, to the top of the hill, crossing over that road, at the immense height to which you have ascended by an embankment or viaduct of twenty or thirty feet over the road. This again, is one of the features which I should have thought conclusive of itself, of the merits of this line. To proceed then to the *tunnel at Cuckfield.* There is another tunnel of considerable length;

the lengths I will give more accurately by and bye. You come into a cutting of 775,000 cubic yards which brings you to a spot, which I must not pass by, as bearing upon the value of the credit Sir John Rennie takes to himself for the admirable materials with which his tunnels will be made. We come to a bridge called Highbridge, a part of the country from which London is to be supplied with admirable stone for building purposes; and in this country where there are stone quarries by the road side, within twenty yards of the spot where the bridge is building, this very bridge is being built, at this moment, of brick. Sir John Rennie says it is a very bungling matter, and so it appears to be if he is right about the stone. However, I am inclined to suppose that people would not build their bridge with brick, when they had stone at hand, if the stone was good for any thing. Then we come to an embankment at Saint John's Common, of which from one end 700,000 yards are to be brought, and from side cutting 420,000 yards, so that you have the same engineer, who, on one part of his line, is to have 1,200,000 yards of spoil, obliged to take 420,000 yards of side cutting. Then we come, previous to entering Clayton Hill and the Tunnel, to the much and far famed crossing at Hassock's gate. The Clayton Hill has then to be tunnelled through, and then you come to an embankment consisting of 770,000 cubic yards, a great part of which honorable Members will bear in mind is also to go to spoil. Here is then a deep cutting before you get to Patcham through the bottom of the valley, and there I am sure honorable Members will remember there is often considerable deposit of water, from which I cannot conceive how Sir John Rennie's cutting is safe, and from which he did me the favour to say, upon my suggestion, that the water was to be drawn for the purpose of supplying his engines. How he will deal with it there, a drain to be made which is to cost from five to ten shillings a foot, and which is to go down the whole distance to the sea; and which, therefore, would exhaust a great part of Sir John Rennie's fund for contingencies I really do not know.

Committee.] What was the cutting there?

Mr. Talbot.] The cutting is fifty feet immediately after leaving the tunnel, and it dwindles down till it becomes thirty-four feet.

Committee.] Can you state the number of yards?

Mr. Talbot.] The total cutting is 770,000 cubic yards, of which a great part goes to spoil, where I am not prepared to say, Sir John Rennie proceeding through this deep cutting encountering the London road, and that he has to pass at a very acute angle indeed. There is to be an archway so askew that it almost amounts in effect to a long tunnel.

However they call it an archway, it is a work of considerable difficulty which will require all Sir John Rennie's skill to execute, and one which will entail upon them considerable expense with respect to the "ulterior arrangement," because it is situated in a valley where it is difficult to arrange matters so as to throw the road over it. There is I think nothing else to remark on with respect to this portion of the line, except the agreeable surprise that Major Payne is to receive from finding this railroad come into the immediate vicinity of his property. As to the nuisance to the church, and the inconvenience of approach, we are still in some uncertainty, because we do not yet know the precise direction of the line, a few yards either way may make the most material difference. There is nothing else to remark on between that and Brighton, except that Sir John Rennie taking credit for passing throughout his line over land of very little value, passes over very beautiful land here of very considerable value.

Then we come to the terminus at Brighton, and of all the monstrous things in this compendium of monstrosities I think this terminus at Brighton bears the palm without dispute. Honorable Members will remember the position of this terminus. It terminates at the corner of a field which overhangs the Lewes road, and runs into and falls into the London and Brighton, and it is thirty-four feet above the elevation of the road, and that road again is thirty-six feet above the London road. I feel more pleasure in repeating, (because it is thought worth while to advertise the contrary, and to say that it is only thirty-four feet above the level,) that in point of fact it is seventy feet above the level of the London road into Brighton at its present elevation, and by some means or other this depôt is to be still further raised, and the approach to this great instrument of opening communication is to be at an elevation of one in fourteen, which is steeper than the ascent up Holborn-hill, which is one in seventeen; and then you are to be perched upon the depôt which is to be made artificially upon the level of this high ground, the elevation being such that any honorable Member going there if he carried his eye forward or projected any thing straight from a level at the elevation of Sir John Rennie's depôt, would intersect the tower of St. Peter's church about the belfry, and finally rest at the top of the houses upon the east cliff. Now is that or is it not a convenient approach for the town people of Brighton? My friend, Mr. Harrison, says that they are the best judges of that. The Brighton people no doubt are the best judges, but they should judge with a full knowledge of the subject, and when they are told by advertisement on the part of those who advocate Sir John Rennie's line, that thirty-four feet is the extent of Sir John Rennie's

elevation, when, in point of fact, it is seventy feet, I have a right to draw the conclusion that they have adjudicated upon this subject with imperfect knowledge, and that those who have maturely weighed and considered the matter have come to the conclusion at which they have arrived on much better data. I do not think my friend could find in his heart (though that perhaps is a hard one) to attack Mr. Stephenson's terminus after I have shewn the mountain which the good people of Brighton and the constituents of the gallant and honorable Member for Brighton will have to ascend when they go to London ;—talk of time indeed, is this no element in the consideration of the time to be occupied between your breakfast table at Brighton and your letters at the Royal Exchange. It will take you a long while compared with the whole time of the journey before you can get up to the terminus. The approach, according to the testimany of their own witness, by which they are to ascend to this height, is to be on an embankment of seven feet, of course dwindling to nothing as it approaches the road. Now that is Sir John Rennies's terminus as far as Brighton is concerned. What is it with respect to Shoreham? You are to proceed from their depôt by a viaduct of seventy feet in order to get up an elevation which you are obliged to ascend from Shoreham by means of an assistant engine for a mile and a half. Now I put it to the good sense of the Committee to say how many coal-carts will find it to their interest to travel up this with the additional cost of the assistant engine, unassisted by the whole traffic upon the line, having to pay for the entire traffic upon the branch, and finding themselves at this great elevation above Brighton. I ask, is it not probable that the object of the coal-carts will be to stop at the bottom of that inclined plane, and if so allow me to remark that they must pass either on or near the western terminus of Mr. Stephenson's line, and a stronger tribute to the good selection of that terminus, so far as Shoreham traffic goes, could not be found. I will venture humbly to predict, though I do not believe that the opportunity for the fulfilment of the prediction will ever arrive, that not one ounce of coal will ever travel up this inclined plane by means of the assistant engine to Brighton.

I believe that I have now gone through the individual remarks upon the two lines, I have now one or two remarks to make, and I will compress them as much as possible upon the *comparative merits* of the line, first, as to the gradients. Now, on Mr. Stephenson's line, the cha-istic or ordinary gradient, as Dr. Lardner would term it, is sixteen er mile. That is universally allowed by all engineers, and by Sir Rennie it will not be disputed, I am sure, to be a convenient incli- for *the passage of* locomotive engines, though, unfortunately, even

TF 64 .L83 T
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at that, one-half of the power of the locomotive engine, as compared with a level, is lost, upon the direct line, as it is called, of Sir John Rennie, the ordinary gradient is 20 feet per mile, four feet per mile more, besides which, you have the assistant power required to draw you up the plane at Croydon, of one in 110; you have on the Shoreham branch the assistant engine, which must pull you up the plane of one in 100 for a mile and a half. Now Mr. Rastrick, Sir John Rennie's witness, has told us that the saving in power on sixteen feet per mile, as compared with twenty, is 14 per cent. on the gross load, and of course as much as from 20 to 30 per cent. upon the effective load. Mr. Dixon, I think, whom we called a practical man, daily superintending the working of one of the few existing lines of railroad in this country, has put it in a shape which brings the matter home more intelligibly to our minds, who are not so well used to these matters, that the difference would enable you to draw one carriage more, and that one carriage would pay the expense of your time. But upon this point, why need I enlarge? With respect to the gradients, not one of Sir John Rennie's witnesses have ventured to dispute the immense superiority of Mr. Stephenson's line. Even Dr. Lardner says, that "Mr. Stephenson's graduation is infinitely the best;" why then should I waste one word more upon that subject.

Let us come, then, to another point, which is always made much of in railways, and justly so, though when one has to defend them, one is apt to look at them as slight inconveniences—I mean the tunnels. Upon the main line, Mr. Stephenson has three tunnels, the longest is twenty-seven chains, a little more than a quarter of a mile. The total upon the main line is fifty-five chains, not three quarters of a mile. On the branch which will only be travelled, of course, by such part of the traffic as prefer the northern to the western terminus, you have a tunnel of forty-five chains, the total being, I think, 100 chains, which is exactly the amount of the one tunnel at Merstham, on Sir John Rennie's line. The inconvenience of a tunnel, and the danger of a tunnel, if there be any, of course increasing in geometrical proportion to its length. The one tunnel at Merstham is equal to every inch of tunnel we have on our line. But then Sir John Rennie, as I have already stated, has another tunnel at Balcomb, another at Cuckfield, and another at Clayton Hill, and this is for a passenger-line; and, be it remembered, it is the passengers and not the goods who complain of tunnel. On Sir John Rennie's line, therefore, you have four tunnels, the total aggregate of distance being 280 chains, which is about equal to three miles and a half.

Then, my Lord, with respect to curves, which is also a most material consideration, both with respect to the just apprehension entertained upon

the subject of danger upon these railroads, and also as to the point of speed in working upon the railroad, the smallest radius of any curve upon our line, is one mile and a half, being just twice that which is considered as the practical minimum of three quarters of a mile, and the total curvature, according to Dr. Lardner's testimony, which I am far from admitting to go near the point in this respect, but even upon the improvements after they have got rid of their eight and fifteen, and substituted a twenty-five chain radius at Croydon, it is as 790 to 840 degrees, being a difference of 7 per cent. We say 25 to 30 per cent. Dr. Lardner admits a benefit to us of 7 per cent.—I really feel upon this part of the case: I cannot do justice to it, because I do not pretend to have followed, or to understand at this moment, the curve at Merstham. How they are to be made tangents to the tunnel there, I do not profess to understand at this moment. I am quite ready to admit that I may be obtuse upon the subject, but such has been the shifting and changing, that I am at a loss to understand it. But I feel confident of this, that if Sir John Rennie's line were even put into execution, the curves would be very different from those which, at last, have been delineated upon the plan.

Now the most important part of the comparison is the amount of earthwork in these two several lines. Now, the amount of earthwork upon Mr. Stephenson's Line is 6,000,000; his slopes averaging at one and a half to one. Sir John Rennie's, with slopes averaging at less than one to one, are 8,000,000 of cubic yards. Now Mr. Stephenson has formed an erroneous estimate of Sir John Rennie's earthwork, it appears, because he assumed the same slopes as he himself took, and taking those of Sir John Rennie's at 8,000,000 of cubic yards to 6,000,000 on Mr. Stephenson's Line, would, if Mr. Stephenson's slopes are adopted, become 10,000,000. If Mr. Stephenson adopted Sir John Rennie's slopes, of course his earthwork would be very much diminished. And here arises a remark, which applies to the whole of this case, and I do not know that I need repeat it bye-and-bye. Even supposing Sir John Rennie could do what he proposes to do, in the time, and at the expense he proposes, I may admit my friend's case, and I say I can do the same. Instead of its costing me a million of money, it will cost me £700,000; instead of taking me from two and a half to three years, it will be done in eighteen months. What you can do, I can do, and you derive no benefit from taking fallacious accounts of earthwork and slopes that cannot stand; because you must admit that what you can do I can do also.

Now, Honorable Members have not sat so long in this Committee without finding out that the measure of the time of the execution of the work *will be the largest* embankment; because, although in cuttings, though you

can begin in several places at once, I never heard till the "Government "Engineer," Mr. Mills, treated us to the intelligence that an embankment can be begun in ten places at once. I believe it is new to Sir John Rennie as well as to Mr. Stephenson; therefore, in our present unintelligent state, and not having yet recovered from the effulgence of Mr. Mills's new lights, we will assume that the measure of the time of the execution of the work will be the amount of the largest embankment, looking to the circumstance that it is to be teamed from one end. Now, the largest embankment in Mr. Stephenson's Line is 700,000, in two embankments, one of which is 400,000, that is to say, he is compelled to work only one-half of 400,000 cubic yards from one end, because, in the middle, between these two embankments, there is a knowl which will give him the same facilities which Sir John Rennie claims for side cutting at St. John's Common; therefore if Mr. Stephenson chose to work his embankment from both ends, he might do it, though I do not say that he proposes to do any such thing. Now, in Sir John Rennie's Line, at St. John's Common, he has 700,000 cubic yards, which, according to his own showing, are to be teamed from one end. Sir John Rennie says he will do that in three years. I had always believed till I heard Sir John Rennie say the contrary, that 200,000 cubic yards per annum was an extravagant estimate of work to be done over the face of an embankment, that is 1,000 cubic yards per diem, for 200 days in the year. I well remember, that last year, when Mr. Lock was opposed to the "Rennie" Line of that day, which was Mr. Giles's Southampton Line, that Mr. Lock very positively and distinctly told us that about 150,000 was about the utmost that could be done in the year. Now, Mr. Lock finds that inconvenient, and I am sorry to be obliged to think that he resorts to a little evasion to get rid of the difficulty. He says, that in his evidence upon the Great Western Railway, he was speaking to an embankment of limited dimensions. Now that evidence, upon being investigated, will not be found to mean anything of the kind; but he refers to the Broad Green embankment, on the Liverpool and Manchester, and there he says 600,000 cubic yards were done in three years. Now, if you look at Mr. Telford's Report, concocted, as he alleges, by the illustrious Mr. Mills, you will find that the amount done in three years was 460,000, being considerably less than Mr. Mills's 600,000 in three years, and that it was widened after the three years; and after the embankment had been supposed to be finished. That is the history of the thing, and I take the liberty of saying, that till I am better advised, I must think that Mr. Lock's estimate that 250,000 cubic yards can be teamed over the face of one embankment in a year, is fallacious. Actual ex-

perience, on the contrary, has shown that from 150,000 to 180,000 cubic yards per annum is the most that can be done; but even supposing that 200,000 can be done by Sir John Rennie, why is not Mr. Stephenson to complete his Horsham embankment in a year? What is sauce for the goose is sauce for the gander; and if Sir John Rennie can do 200,000 cubic yards in the course of one year, why cannot Mr. Stephenson do the same? The fact is, that neither of them can do it.

Now having pointed out the discrepancies between the two lines—having shown how immensely superior ours is in point of gradients by the admeasurement of all the witnesses—having shown how superior ours is with regard to the execution of the earth work, as will be apparent when the sections and evidence are looked at, I am at a loss to know, though I hope my friend will tell us by-and-bye, why, in the name of fortune, this line with four immense summits to traverse, with four ridges to be crossed, is to be preferred to a line with which one summit, and with much better levels, passes those ridges and encounters nothing. I am inclined to think that the real secret of it is this, that Sir John Rennie not being very familiar with the engineering difficulties in the way of constructing a railroad, he never having executed a single railroad in the whole course of his life, has been carried away by precisely that which does carry away, and would influence the mind of a person who does not consider the thing in all its bearings by the notion of the directness of his line.

This consideration brings me to the relative lengths of the two lines, and I think my friends and their witness, Dr. Lardner in particular, have used us a little ill, because why on earth you should compare the length of our line up to the northern terminus with Sir John Rennie's line, I cannot conceive. In making a comparison by which you are to impugn the opinions of eminent men of daily growing experience, it seems to me that it would be reasonable and fair to make the comparison from the terminus at the west, which gives us a shorter line, and which gives us, if there be any thing in my arguments, an excess of advantage over the terminus of Sir John Rennie. That is the comparison which ought to be made. Show me one individual who will be benefitted more by Sir John Rennie's terminus at the top of his depôt at the level of the belfry of Saint Peter's Church, than by Stephenson's western terminus, and then I will admit that you have a right to compare the two lines up to the northern terminus. Let us look then to the distances on our line as compared with the distances on the line of Sir John Rennie from the ern terminus. Now in round numbers, without going into chains only embrangle the matter, Mr. Stephenson's line occupies a

length of the western terminus of about fifty-five miles. Sir John Rennie's line adopting the Croydon and adopting the Greenwich, occupies a space of fifty miles. Now I put it to honorable Members whether I am exaggerating the matter when I am laying aside the alleged inconveniences of our termini, whether there has been any other real point made against Mr. Stephenson's line but the increased distance, and that amounts to five miles of additional road to be travelled at the rate of thirty miles an hour, which at that speed would occupy just ten minutes. It is therefore a matter of ten minutes if Mr. Stephenson is right in saying he will travel thirty miles an hour.

Now, I think I am justified in saying, that the objection of increased distance resolves itself into the two objections of increased expenditure of *time* and *money*, for I apprehend that the most captious ten-pounder in Brighton if he were taken to Brighton at the same or a less cost and and in the same time, would not stop to consider the number of revolutions made by the wheel. Whether he travelled 55 miles or 155 miles instead of 50, would be to him the same thing, though it is now trumpeted forth in the most industrious way as I shall have an opportunity of showing presently, that it will make a difference of from a shilling to eighteen-pence each passenger, and so on. Now let us look at the two objections as to time, as to money the expenditure of which is to be greater on our line than on their's. In point of *time* as I have shown you, it is ten minutes. Now per contra, you have it from Dr. Lardner, that curves are to be considered in calculating the speed at which the engines may travel and that there are more curvations of a smaller radius on Sir John Rennie's than on Mr. Stephenson's line. Seven per cent. he gives us there. You have it further in evidence that the characteristic gradient on Sir John Rennie's line is 20 instead of 16 feet per mile, and that there is besides a greater amount of this characteristic gradient by four miles. That, too, is entirely exclusive of the inclined plane at Croydon, and entirely exclusive of the inclined plane upon the branch from Shoreham. Dr. Lardner who has had no experience of the practical working of railroads, who may be a very engenious man while sitting down and twisting figures at the London University, but who knows no more of railroads than we unfortunate sufferers in London may know by a half yearly visit to the Liverpool and Manchester Railway, he tells you that you are to travel at the rate of 25 miles an hour up that inclined plane. Mr. Dixon, and Mr. Stephenson, and Mr. Sinclair, practical men who have constructed railroads and are daily engaged in working them, and who know what happens to every train passing along them, tell you that on an average the speed on which you can rely is from 10 to 12 miles an

hour up such a plane as that. They have had experience in that, for on the Liverpool and Manchester there is a plane of one in 96 worked by an assistant engine. Now really with regard to the assistant engine it is a matter of common sense. You are to be assisted up this plane by an assistant engine. You arrive at the foot of an immense summit without giving much notice of your coming. The assistant engine is to be guided by an engineman who is not free from all the failings of inaccuracy and impunctuality which are natural to us all. It frequently happens that the assistant engine is not ready. Nine-tenths of the delay, says Mr. Stephenson, and nine-tenths of the apprehended danger, and sometimes actual danger (for although Dr. Lardner thinks fit to deny that any case has occurred, I believe he is in error there,) in the Liverpool and Manchester Railway occur from the assistant engine. You cannot make men clock wheels, and till you do that you must have accidents and delays. I am not saying this will be much, but when you are considering a question of ten minutes it becomes very material, and anything that takes from that shows you how preposterous it is to say it is better to go up and down hill, over hill and down dale, rather than along the bottom. We really are said to live in a state of marching and improving intellect, and I believe we do, and in no respect has intellect marched, and in no body of men has it improved so long or so rapidly as in the trustees of turnpike roads, and they have found out contrary to their forefathers, that instead of going up a hill and down again you had better go an increased distance, or, as an honorable baronet said, the longest way round is the fairest way home.

Committee.] My words were, "the farthest way round is the nearest way home."

Mr. Talbot.] The words are not material, the sense is the same, and the very circumstance that it is a proverb, shows it is founded on good sense, in fact there is no mystery in these matters; locomotive engines require a different sub-stratum; they are to travel over an iron instead of a Macadamized road; but whatever reason there was for throwing the carriage on a level on a turnpike road, and so increasing the distance instead of sending it up hill and down again, applies with tenfold force to locomotive power, where level is more emphatically the great desideratum. It therefore appears to me to be reasoning against common sense and common experience, to say that it is better for the sake of shortness to take the line over and down hill, rather than to take a level. That seems to be going back instead of forward, and is opposed to any benefits we are to derive from the increasing expansion of knowledge to which railroads are to give rise, as one thing can be to another.

TF 64 .L83 T13
Stephenson's Lo

But, my Lord, the gradients are one cause of delay—the assistant engine another—the curves are another cause of delay, and another cause of delay and a most important cause, consists in the junctions with these two other railroads, because when you come to reflect upon the circumstance that they are to unite first with the Croydon Railway, and it is amusing to remark, in the progress of the case, how they were obliged to shift and turn again. You remember, I am quite sure, when it was first talked about, it was said Croydon was a most important place, and it was said to be a most desirable thing for the inhabitants of Croydon that there should be a depôt there. But then came Dr. Lardner, and he found that if they came to stop in a depôt, his ten minutes would be gone, and therefore he thought it expedient to suggest an alteration, by which these unfortunate people at Croydon are not to have the benefit of the first class trains, but are to travel in the second class trains, and the first class trains are to whiz by like balls out of a musket-barrel. That is the benefit the Croydon people are to derive from Sir John Rennie. However they are still to join the Croydon Railway. Upon that railway there is to be a considerable traffic to London. Upon the Croydon Railway the south-eastern traffic is to join. There must be backwards and forwards a very considerable crossing and traversing of trains. A Brighton train has to come up, and of necessity has not only to slacken its speed down to five miles an hour, according to Dr. Lardner, but possibly, and almost invariably of necessity, it will have to wait for the arrival or passing of one of these trains, seen to be approaching. That will make a hole in the ten minutes. I hope the Committee have not forgotten the evidence given by Mr. Vignolles and Mr. Pim, with respect to theKingstown Railway; but I will here make an observation, by leave of the Committee, in a parenthesis, with reference to the terminus at Brunswick-square. The experiment has been tried in Dublin, and the railroad between Kingstown and Dublin comes exactly at the back of Merrion-square, which is, in fact, the Belgrave-square, or rather the Grosvenor-square of Dublin, and there it is found to be no practical nuisance. I beg pardon for introducing that parenthesis, but the name of Mr. Vignolles recalled it to my memory. Mr. Vignolles says trains pass every ten or twenty minutes, and that on no account would he suffer a junction of another railroad. He says it would not be safe—it would impede the practical working of his line, and would be attended with danger, which he, as an engineer, would not for one moment sanction. Remember you are to travel upon the Greenwich, which for a short line of four or five mil cost more than £100,000 a mile. If that railroad is to pay the

jectors, it must be by an enormous traffic, and by trains succeeding one another very rapidly indeed. I apprehend, therefore, that if not on every day, yet on many days in the year, there will be scarcely an interval of five minutes between the passage on any particular spot of that railway of different trains going either one way or the other. Now at the point of junction the Croydon passengers, the South-eastern railway, and the Brighton Railway, will be competitors for those intervals of five minutes, and according to which succeeds they will waste there ten or five minutes. At all events the speed must be slackened, and I ask, whether in point of practical safe working of the line, it is probable or possible to be believed that a considerable delay must not ensue there.

I have omitted, I think, to notice with resqect to the assistant engine, also, independent of the delay which may occur from want of punctuality, the witnesses who are daily seeing it in operation also say you must slacken your speed as the assistant engine comes up, or else your going thirty miles or twenty-five miles an hour, and the assistant engine posting after you at a greater rate to catch you, the collision will be fearful; and it is not in practice found safe to proceed at the usual rate, but you must slacken your speed and allow the engine to overtake you at a more moderate pace. If all these points be so; if you have the curves and gradients—I say nothing of the tunnels; if you have the junctions; if you have the assistant engines, and their necessary delays, I ask you, have you any doubt, whatever men may say in this room, and however easy it may be to theorize—I do not wish to use hard words with respect to the dealings with figures, which are proverbially fallacious —but, I ask, do you believe that there can be between these lines any difference in point of time of travelling, but a difference in favour of Mr. Stephenson? They do not pretend to more than ten minutes, and I say I have shown you that which over and over again will place the balance in point of time in our favour.

That is one element in the objection of increased length. Now let us come to the other, which is *money*. Now let any man in his senses look at the section lying before me, remembering the work to be done in the other line, and say whether cutting through hills, and tunelling again and again, any man in his senses can doubt that fairly considered, looking at the slopes as they really will be and must be, that the expenses of the formation of thirty miles of this railroad of Sir John Rennie's, as compared with thirty miles of Mr. Stephenson's must be greater. It would be an insult as it seems to me to common sense to suppose you would come to any other conclusion. Now Sir John Rennie's estimate for his *line for* the junction with the Croydon to Brighton, including the Shore-

ham branch, is £900,000. Now, considering that on Sir John Rennie's line he has an average lead of one mile and a half, while Mr. Stephenson has an average lead of three-quarters of a mile, I have no reason to induce me to believe that there is any earthly ground for thinking that the work on one line can be done cheaper than on the other. On the contrary, it is inconsistent with common sense and experience, that where you have to lead the earth twice as far, the expense must be considerably increased, even allowing for some difference in the soil to be excavated. Now Sir John Rennie, notwithstanding all that, says his estimate is £900,000 as against Mr. Stephenson's million. Now, with respect to the line beginning at Croydon and ending at Brighton, occupying a space of thirty-nine miles, if the committee would put us on an equal footing as to prices, Sir John Rennie's estimate, taking Mr. Stephenson's data as to prices, would be £1,300,000 instead of £900,000 to our million. Now, when you see you have less slopes and less prices, and less every thing where you would expect every thing greater, am I not bound to ask whether there is not some juggle and some deceit in this case, and that on a fair comparison between the one and the other, the balance must be largely in our favour upon the expense of formation.

Now, masonry is an important item, and among other articles of masonry, are occupation bridges. Occupation bridges, allow me to say, where embankments and cuttings are greater, must be more expensive, must be more frequently required, and must be larger whenever they occur, than on a line where the railway is chiefly on a level; for if there is a deeper cutting, you must have a wider gash in the earth, and the bridge must cost more money. Now, upon the subject of occupation bridges, Sir John Rennie, with a magnanimous generosity, for which I cannot be too thankful, says, "we shall give them, at least, fifty accom- "modation bridges." Why, Mr. Stephenson proposes to give them 100 accommodation bridges, and I would ask whether the one is not the estimate of an honest and practical working man, as opposed to the estimate of a man who, whatever he may know about making ports and other matters, does not know his business as a maker of railroads, but who pretends to knock down the fair estimate of a man who knows what the real necessities of the case require. Then with respect to the formation of the railway itself, that is a point on which experienced and practical men must have an advantage. It depends very much upon the laying down of the rails, and the ballasting. That, according to Sir John Rennie, is 4,300*l.* per mile; according to Mr. Stephenson, it is 6,000*l.* per mile: there is a small difference, pretty nearly enough to eat up the whole sum that Sir John Rennie has set apart for contingencies.

Now, with respect to land, Sir John Rennie says, that he goes through a country less rich and fertile, where the land is probably less valuable than that which we take. If that be so, he must allow me (which he will not do willingly) the advantage arising from the more extensive population, and the greater wealth of such a country. If we are to have the disadvantage one way, it is but fair that we should have the advantage on the other. However, it must not be forgotten that that part of Sir John Rennie's line, which passes through the heart of Croydon, passes through land which will cost him a precious deal of money, independent of Mr. Carbonel's park. Now, let us see how it is:—Sir John Rennie says, he will take 50,000*l.* for land, and Mr. Stephenson takes 100,000*l.*; this is open to the same observation as I before made, with reference to the time of execution of the work. If Sir John Rennie can do it, why should not Mr. Stephenson; and Mr. Stephenson must be one of the greatest noodles and dolts upon earth, if, having acquired the knowledge which he has acquired, he did not take advantage of it. If he could, he would beyond a doubt put his estimates as low as those of Sir John Rennie: all engineers must have an interest to keep their estimates as low as they can, but he has not found out how to do what Sir John Rennie says can be done, notwithstanding Mr. Stephenson has had long and practical experience on the subject, and Sir John Rennie has never constructed a single railroad. The inference, therefore, which I call upon you to draw is, that the prices set down by Sir John Rennie are not the prices at which the work can be done.

Then with respect to tunnelling, that is another item:—Sir John Rennie has a great deal of tunnelling on his line, and it is necessary that he should keep it down in his estimate. We take 40*l.* on the running yard, the estimate on the Birmingham and Great Western, and Sir John Rennie takes 25*l.* on the running yard: that would make a monstrous difference in the estimate, namely, fifteen times 6160, the number of yards of Sir John Rennie's tunnelling, equal to 92,400*l.*

Now there is another point connected with the estimates, to which I am anxious to call the attention of the Committee. Sir John Rennie took credit to himself (though of course it was not wanted, his estimate being, no doubt, sufficient for all he had to do), and he said there is one thing which I ought to mention, that I shall make 40,000*l.* by my chalk. I throw a great deal to spoil, and that is very valuable, and I may look for a considerable return from that source. But Sir John Rennie appears to forget that he cannot keep that secret to himself, and if he knows that that chalk is worth 40,000*l.*, does he suppose that the landowner will let him go and get it for nothing? So far from being an advantage, Sir

John Rennie will be obliged to pay 40,000*l.* for royalty on this chalk, and recover it as he may. So that he will have to wait for that which is to bring him this 40,000*l.*, and that little anticipated nest egg he will find to be an outgoing in the first instance.

Now, there is another point upon the subject of his estimate which I really must not pass over. It is with reference to the very large and ample scope which Sir John Rennie has given to the Contingency Fund. I am sure that honorable Members will remember, that the moment any work was alluded to, for which it was not convenient for Sir John Rennie to state the accurate price, it went to the contingencies at once. Among others, I remember the depôt at Brighton was one, the approach to the depôt at Brighton was another. The formation of a station for his engines, which is as necessary for a railway as a stable is for your horse. The sheds for the depôt, the drains on Clayton hill to carry down the water, which water he actually told me was the water that was to supply his engines, and yet, in the same breath, he had the good nature to tell me, (for it amused me very much) that the water was to be paid for out of the expense of working his line. Now that is like paying for the horses of a stage coach by the profits of working the coach before you have any horses. You are to make a profit without the most essential element of power, but that is the way in which this practical engineer looks to the profitable construction of the railroad. Then there was that which I cannot forget, for it seems to me rather a startling thing for Sir John Rennie to have done. The Committee will not forget Hassock's lane, and the work at that part Sir John Rennie has made his estimate, including, of course, that part. When he came to be cross-examined to it, it turned out that he was to throw the road over his railroad, and that would take an embankment amounting to about 60,000 cubic yards. That is found to be inconvenient, and then at the eleventh hour almost, a person is sent down to make the section, and then you find that Sir John Rennie proposes to go over instead of under the road. The estimate is made to suit both these objects. How that can be done consistently with the real truth, and consistently with that knowledge of his business, which an engineer ought to possess, I leave the Committee to determine, for I am at a loss to discover. Now it is always useful, and it is found necessary in practice to include a certan sum for contingencies. Sir John Rennie does more with the money he puts down under the head of contingencies, than any man I ever knew in my life. He appears to me to have a different interpretation of the word contingency than that which usually strikes persons familiar with the English languge. I had

the curiosity to look into Johnson's dictionary this morning to see what definition he gives to the word, and I find he says it is an "accidental possibility," that is, in this case, an accidental possibility in the construction of a railroad. An accidental possibility is a thing which no man can foresee, it is the fissure in chalk where he expects it to be solid; it is rainy weather which prevents him from working; it is a slip in the bank, the team going over the face of the embankment, these are contingencies which it is absolutely necessary to provide for. But Sir John Rennie includes in his contingencies, things without which his line would be no line, things which he must have known the necessity for. Does Sir John Rennie mean to tell me that he does not know he must have a depôt and sheds at Brighton? If he knows that why is that expense to be covered by "*contingencies?*" The fact is, that he had made an insufficient estimate; that he knew that he had made an insufficient estimate, and that he thought the only way of getting out of it, and the only way to put a stop to inconvenient questions, was to say either that it was a matter of "*ulterior arrangement*," or that it was included in the "*contingencies.*"

Now, my Lord, as to the money: The estimate of Sir John Rennie takes him to Croydon; from Croydon he has to travel upon the Croydon Railroad. The original capital upon that railroad, was £140,000. They had power to borrow £60,000 more. They had to buy up the canal on such parts of it as they injured, at a sum of £42,000. They have to pay a further sum of £18,000 for the enlargement of their depot, and there remains their original capital to be expended upon this Croydon Railway. But if there is any truth in what is said, as to the increased work to be encountered, that sum must prove wholly insufficient for the formation of the railroad. Then you get upon the Greenwich Line, which you travel for the two most expensive miles of the line, which cost £150,000 a mile, of which you are to bear a proportion of the expense. And then I am to be told, as if my proposition was founded in manifest absurdity, that the longer line cannot travel cheaper than the shorter; I say it can, upon the ground that I would rather go twelve miles upon a level turnpike-road than ten miles or eight miles up hill; it is precisely the same thing. If you are to have the same speed, you must have more power; and if you are to have more power you must pay for it. You may do which you please. You may take your four horses up hill, and keep the same speed as two horses on level ground, but you must pay more if you do than you would pay if you went along a level. There is no difference whatever,

I had rather take a practical illustration of that kind, than I would

TF 64 .L83 T13
Stephenson's Londo

take the conundrums of Dr. Lardner, which are applied to just and honest projects for railroads whenever it is an object to beat down that proposition which is the fair one, and to exalt that which is founded on extravagant principles. Then we are told that the Greenwich Railway is to be widened; if so, it must be at considerable expense, and that would add very strongly to my argument. Now I cannot depart from this subject without adverting to what I consider a fallacy, and although I am reluctant to say it, I must say it seems to me a designed and intentional fallacy, which is put upon the good people of Brighton, upon this subject. Let me call the attention of the Committee to this, which is put forward by the promoters of Sir John Rennie's Line: "Should, there-"fore, the Bill for the circuitous line, as now before Parliament, be "adopted, it will entail upon the public an extra tax for passengers of "1*s.* each journey (all railway charges being 2*d.* per mile) besides an "increased charge for the transit of goods. And if the proposed junc-"tion between the circuitous line and the Croydon Line take place, the "public will be taxed 2*s.* each journey for passengers, and a proportional "increase for the transit of goods." Now, a grosser fallacy never was palmed on the public than to say that because the line of Mr. Stephenson is five miles longer than that of Sir John Rennie, the charge is to be 10*d.* more because the maximum rate is 2*d.* per head. Every railroad takes a maximum rate in its bill. Every railroad makes a charge which will remunerate it. The charge at which passengers are to be carried is made up of expenditure and profit. Now suppose Sir John Rennie's Rail-road could not be executed for a million and a half, would passengers be carried on his line at the same rate as upon Mr. Stephenson's; the thing is absurd upon the face of it. Either he will not carry at all, or Mr. Stephenson must greatly undersell him. In such a case as that, if Sir John Rennie can carry for 2*d.*, it is matter of arithmetic that Mr. Stephenson could carry for 1½*d.* Then is it not too trifling, I was going to say, too wicked, to put this forward as an argument against a *bona fide* and honest measure, and to say that because the charge is inserted in the Bill is 2*d.* a mile, it therefore follows that the line of fifty-five miles is to charge 10*d.* more than the line of fifty miles. I would recommend the Honourable Member for Brighton to ask his constituents whethey they know that that is a humbug, and a gross and palpable delusion; or, if not, I am sure he will be good enough to explain it to them in language better than I possess. I hope that I have disposed of that which seems to me the only even plausible objection to this line—I mean the increased distance. I have end[illegible]ly or not, the

Committee, are to judge, feebly I am aware, that in point of time it cannot be that more time can be expended upon the longer than upon the shorter line. Neither can it be said that the line which has that great excess of earthwork, that great excess of tunnel, and that great cause of increased wear and tear, the two assistant engines can be travelled cheaper or quicker than one free from those difficulties. If it cannot, I ask with great confidence, what becomes of Sir John Rennie's case. Now, my Lord, I must take the liberty of adverting, for one moment only, to the subject of the feeling which has existed at Brighton upon that subject. That rests entirely upon the evidence of Mr. Clarke, given very early in the progress of the case, and the substance of that evidence is, that in 1833 and 1834, Stephenson was called in as umpire between Sir John Rennie and Mr. Cundy, and recommended the survey of a different line from either. On the 27th of July, 1835, a general meeting of the inhabitants was duly convened.

Mr. Taylor here objected to the course of observation as being unconnected with engineering merits.

Mr. Talbot.] I will save my friend his objection and confine myself to the general remark, that, notwithstanding all my friend Mr. Harrison has said, I do not think the elective body at Brighton are the most competent judges as to the comparative merits of two competing lines of railroad, and why on earth they were introduced into the case, except it were for the purpose of influencing votes in this Committee, I cannot conceive. I cannot conceive why the ten-pounders of Brighton came to be pressed into the service, except with that palpable object. I say that an engineer must be a much more competent judge as to the merits of a line than those individuals can be, and I trust it will not be forgotten that at a meeting which was held upon that subject the former resolutions were rescinded, and that Sir John Rennie, who attended that meeting and refused to answer any questions, especially as to the tunnels,—however, I will not dwell more upon this topic. We hear something of reactions, and I am quite satisfied, that, notwithstanding the advertisements which have been so industriously circulated, and notwithstanding the two-pence a mile about which such a parade has been made, men will come to their senses hereafter, and will know right from wrong; and I expect that much better taste and much better knowledge on the subject will be found to prevail when next the honorable and gallant member for Brighton, and his honorable colleague shall pay a visit to their constituents.

I must now advert to the evidence on the one side and on the other is part of the case, which I will do in a few words:—Now the line

of Mr. Stephenson as respects its engineering merits was supported by himself in the first place, and after what my friend Mr. Harrison told you, that Mr. Stephenson's name alone was worth at least fifteen per cent. premium on the Stock Exchange, I need not waste your time in proving how valuable must be his judgment on a matter with which he must be so fully conversant. He is descended from a man to whom his country is under the deepest obligations, and he continues with the hereditary talent he derives from his father, much that he has himself acquired, and I take the liberty of saying, that there is no man whose opinion is entitled to more respect, not only from the data on which it is bottomed, but from the modesty with which it is supported. Now his opinion is confirmed by Mr. Vignoles, who, I believe, has had more experience in railroads, both at home and abroad, than any other man, the elder Mr. Stephenson excepted. Mr. Vignoles, if he were open to feelings of jealousy or rivalry upon the subject, is the very man who would decline to give evidence in favour of any other line than his own; but he comes before you and says,—" I approve of the direction which " Mr. Stephenson has taken, I should have taken it myself, but from an " apprehension that the Mickleham valley could not be crossed with the " consent of the landowners. Mr. Stephenson has made a deviation " which I pointed out as expedient, to the westward, and in my opinion " that is the line to be taken." Then Mr. Stephenson was supported further by Mr. Bidder, against whom I dare say my friend Mr. Joy will dilate hereafter. I am quite satisfied to let Mr. Bidder remain upon his own merits, with the exception of saying, that he was at his own desire checked three times over in all his calculations, that they have been examined by Mr. Stephenson since, and that he is confirmed in every iota of them. Then we have Mr. Grainger, another witness; Mr. Dixon, the superintendant of one of the railways running into the Liverpool and Manchester; Mr. Sinclair, himself superintendant of that railway I believe; Mr. Pym and Mr. Wood, who are both connected with the Dublin and Kingstown Railway; and Mr. Brunel on an examination of the sections gave a decided opinion in favor of Mr. Stephenson's line, and to that opinion the Committee cannot fail to pay some attention.

With respect to Sir John Rennie, I have already made some comments upon the evidence which he has given, and it would be painful to me to say all that I could fairly say with regard to him. I will content myself with observing that he has made some undoubted mistakes in this case, that he has spoken positively to that as his line which he knew not at the time and which subsequent surveys have proved

impracticable. I would remind the Committee that this is his first experiment in railways, and I would ask whether you can rely on his judgment in preference to the judgment of those practical men you have heard on the other side. Now as to the witnesses who supported him as engineers. It is amazing what a crop of mushrooms have sprung up in a short time, ever since the resolution was passed which required them to be engineers. They are all engineers now. However, those whom *we* should call engineers among those who have been called to support Sir John Rennie's line are Mr. Rastrick, Mr. Leather, Mr. Price, Mr. Mills, and Mr. Locke. Mr. Rastrick admitted that at the time he gave his evidence he did not know the curves or the length of the tunnels, and yet he came to speak to the merits of the railway. He admitted a balance of fourteen per cent. in our favor upon the gross load we could carry. With respect to Mr. Rastrick, Mr. Leather, Mr. Price, and Mr. Mills, the sum total of the experience they have had among them is four miles of railway—that is four miles for Mr. Rastrick, and none as I believe for the others. Mr. Price tried his hand at the Clarence Railway, I understand, but did not succeed, and somebody else was obliged to rectify his errors in the same manner as Mr. Rastrick's, were obliged to be remedied on the Bolton and Lee, and he has failed to explain how he is to join the Greenwich Railway, being twenty feet above the level. With respect to Mr. Locke, he is a man whose talents it is impossible not to respect. I could wish, however, that they were confined to the display of his knowledge on engineering matters, and that he would not try as he does to get out of a searching cross-examination; he certainly does understand as well as any gentleman I ever met with, how to slip out of a cross-examination. I did not cross-examine him myself, and therefore I speak without prejudice; but I had the pleasure of hearing him very ably cross-examined by one of my friends, and I thought where he could he would do us as much injury as lay in his power, and the evidence he gave as to the amount of earthwork to be done was a strong instance of that. But Mr. Locke did this, and it was but fair and right in him to do it; he would not answer the spur at all, and when my friend who examined him in chief, asked him to compare the two lines. I challenge my friend to put his finger on any answer in which Mr. Locke gave his opinion in favor of Sir John Rennie's line in preference to that of Mr. Stephenson. Now if he had said, that in his judgment, Sir John Rennie's line was better than Mr. Stephenson's, I might have been in some difficulty, but no such difficulty exists here.

to the rest I am not afraid of their testimony. They consist either

of contractors connected with the Rennies or with Joliffe and Banks who are interested in the Merstham line, and who were art and part, as the Scotch say, with the Rennie's. These contractors are persons who are very likely to undertake a job upon the chance of making what they can by it, they well knowing that they cannot be much worse off than they were before, and yet you are asked to compare those men with the Messrs. Cubitt's, who have large property and some stake in society. Those were the men we called to speak to our estimates; but they called such men as Mr. Hoof, who was so completely ignorant of the subject that he told me that the cost of leading per cubic yard, which costs, notoriously, two-pence a mile at least, might be led three miles for a penny. Now, upon the Liverpool and Manchester line, where there is every facility for locomotion, who cannot convey a ton of goods for a penny a mile, much less over an embankment, with all the difficulty of a horse-power, and so on. Mr. Price certainly did us the favour to say, that a man who could say that must know nothing about his business. That was testimony, which coming from an enemy, was the effect (to use an appropriate word) of trampling Mr. Hoof under foot.

Then the next, and the last, I have to comment on, is Dr. Lardner: and with reference to Dr. Lardner, I really must say that I regret that he was put into the box, because I really think that his evidence, varying as it does in different Committees, giving in one answer one day, coming to correct it the next, and then making a further correction the day after, is very little likely to lead the Committee to come to a correct conclusion one way or the other. He has the power of mystifying those who are less familiar with numbers than himself. It is easy for him to make a calculation which, while he is under cross-examination, no man can sift, and he can, by that means, throw a cloud over parts of his evidence, and make the worse appear the better cause. With respect, however, to Dr. Lardner, he has done that which wiser men than the individual who has now the honor to address you have often wished, "Oh, "that mine enemy had written a book." Dr. Lardner has written a book in which he has committed himself, to certain rules which he considers the necessary foundation for the proper execution of a railway, and which he means for the guidance of the public; and Dr. Lardner has told my friend, who cross-examined him, that out of six plain rules for the guidance of engineers and Committee-men and those who have to judge upon the comparative merits of rival lines, Sir John Rennie has violated five, and that not one of them is violated by Mr. Stephenson. Need I then trouble you further with Dr. Lardner's evidence? I say it does

not assist my friend's case at all, and with that observation I will leave it.

I trust, therefore, my Lord, that upon the whole of this case, looking at the section which of itself ought to carry the verdict; looking at the fallacy of the argument about time, and looking at the important interest embraced by Mr. Stephenson's line, inferior to none of Sir John Rennie's, your Lordship and the committee, after having heard my friend who will proceed to dissect what I have been saying, and as he will tell you to place the truth nakedly and fairly, before you will come to the conclusion to which Mr. Vignoles arrived, when he said emphatically, "There cannot be a second question that on any engineering grounds there is no other line to Brighton but this."

The Committee then called on *Mr. Waddington* to sum up the case in support of Mr. Cundy's line.

Mr. Waddington said that as Mr. Talbot had not attacked Mr. Cundy's line, or at all referred to it, it might perhaps be more convenient for him to reserve his summing up until after the Counsel in support of Sir John Rennie's line should have been heard.

After some little discussion Mr. Talbot resumed his address to the Committee.

If the Committee will permit me, I will just say one word with respect to Mr. Cundy's line, which had escaped me. Now Mr. Cundy's accusation against Mr. Stephenson is, that he has pirated his line. If he has I do not know that it matters much, except with regard to Mr. Stephenson's character. If he had been a Red Rover among engineers, and had taken from another the fruit of his skill and labour, I do not think the Committee would attach much importance to it, as against the promoters of this Bill. But it is impossible that it can have been so, for when Mr. Cundy comes to put in the ordnance map, with his section of Mr. Stephenson's line marked upon it, it is found that he actually lays down this line a quarter of a mile distant from that on which he himself relies. Mr. Cundy has also made some very extravagant use of his engineering powers, for he has made the River Mole ten feet higher than the stream which runs into it; and he has told you a 74 gun-ship may float upon the floods of that river—that you may go down there some Saturday night—that you may sleep there on Sunday night, and that on Monday morning you may see Mr. Stephenson and his rail-road and embankment gone, washed away by the flood. I think I may leave Mr. Cundy there, only making this observation, that when he

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called Mr. Mills the Government engineer, that man of signal modesty and merit, he said "that is not the best line (speaking with reference to Mr. Cundy's line). I will show you a better," but the Committee did not think fit to give him a trial.

With respect to Mr. Gibbs, I have already adverted to that line, but I am most anxious, on the part of the promoters of this bill, who are subject to the imputation of now seeking, as my friend, Mr. Joy, eloquently expresses it, "to hook on London-bridge to the Brighton line," positively to deny that there is any stipulation of that kind. As I said before, the noble Chairman is perfectly cognizant of the terms of that agreement, which has been placed in his hands, at the instance of the parties themselves. The sole object has been to accommodate Croydon with reference to Brighton, and I say it now publicly, that anything like buying off Mr. Gibbs, or placing one farthing into his pocket, to retire from this contest is as foreign to the truth as any one thing can be from another.

The Chairman.—I have the terms that have been signed by the parties, and I can pledge my word of honor, that there is not a word about money, or anything of the kind mentioned in it.

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